

From owner-qrp-1@Lehigh.EDU Sun May 19 22:32:44 1996
From: wa5whn@ix.netcom.com (Jay Miller)
Subject: [8701] 10 meters QRP, May 18 & 19
Message-ID: <199605200207.TAA09179@dfw-ix9.ix.netcom.com>

Dear Fellow QRP Enthusists,

>From My Location, both Sat. (May 18th) & Sun. (May 19th), 10 meters was open for most of the day, with both Sporadic E & Transequatorial propagation. Mainly Montana, Idaho, Northern California, South Dakota, Texas, Florida & Central & South America. Repeatedly checked & called on 28.060 MHz cw, but no answer. However, the SSB Novice/Tech (USA) portion was a live with activity. Maybe that near miss, by that Asteroid, had something to do with it, this Sunday ? ;-) (1/3 mile in diameter). Everyone read "Lucifer's Hammer" ?

5 watts SSB, I had worked AIR @ Andrews AFB crossband (Armed Forces Day-May 18), on 20 meters. Even surprised me. He gave me a 5/3, but he had heard me.

So did anything exciting happen @ Dayton ?

72...Jay, WA5WHN, Albuquerque, NM

From owner-qrp-1@Lehigh.EDU Sun May 19 22:32:44 1996
From: Jerry <jfelts@rapidcity.com>
Subject: [8685] A Story Of My St.Louis Tuner
Message-ID: <199605190543.XAA03028@host1.rapidcity.com>

Wow it finally came in the mail. Opened up the package and all appears ok. Read the instuction manual and made changes and notes per "Latest St. Louis Tuner Manual Updates". Enough for one day.

Next day, painted front panel and rear panels harbor blue; Perfect. Spent a lot of time trying to get the sticky stuff off the cabinet cases where the tap was. Painted the cabinet cases horizon blue. What a mess!! Did not get all the sticky stuff off, looks terrible. Will haave to sand it off tomorrow and start again.

Wind the toroids, gee how I hate doing that!! T1 & T2 no problem, I still hate doing them. T3 not hard except my vom is in my car and its not here right now. Oh well tomorrow.

Now for L1, did I say I hate winding toroids? What a pain, can only get 57 turns on it and it looks awful. Decided to do it over, now it looks a lot better, but

I could only get 59 turns on it and its very tight. Do not understand the step "remember to not have the twists on the curved side of the coil but on the flat side. It looks round and flat to me, Oh well I probably did it wrong!

Thought this would be fun, hope you all don't mind it, if ya do I'll stop.

Jerry NR5A

From owner-qrp-1@Lehigh.EDU Sun May 19 22:32:44 1996
From: iapizloj@biccc00.bi.ehu.es (jon Iza)
Subject: [8687] Argo 515 with a surprise!
Message-ID: <9605190900.AA26994@biccc00.bi.ehu.es>

Gang,
I bought a third (?) hand 515 from a VHF-only guy in the East coast of Spain. It came with a surprise. I didn't figure out why he was using the rig until I noticed the switch for 10 meter subbands was open from 4 stops to 6, and they where on the bottom part of the band... You figure out ????
Yessir, Good Buddy!, Right there, on a small empty area of the original xtal board, two more xtals, covering 27-27.5 and 27.5 -28.0
I hope not to confuse the switch position and start "Breiko, Breiko" in 10 meter:-) :-)
jon, ea2sn

From owner-qrp-1@Lehigh.EDU Sun May 19 22:32:44 1996
From: "Bill Kelsey - N8ET - Kanga US" <kanga@bright.net>
Subject: [8702] Back from Dayton
Message-ID: <199605200255.WAA23104@brutus.bright.net>

I also survived FDIM...

After a day or so of recover time I will:

1. Put a copy of the paper I gave at FDIM on High Performance DC Receivers out on my Web page.
2. Catch up on the orders and catalog requests that came in while I was in Dayton.
3. Catch up on the orders from Dayton.
4. Post a list of RSGB books (mostly on Antennas) that I got from the RSGB for resale. Quantities are very limited.

5. Get an order off to Hands for GQ-40's or GQ-20 if anyone on the list is interested (It was the first xcvr in the review article in the QST that just arrived).

For those of you that missed it - FDIW was GREAT! - Paulette, Bruce, Bob, and Preston did a wonderful job. I did not notice anyone nod off any time during the day, and the room was full, which tells you that all the papers were excellent.. Lots of neat rigs and other items on display every night at the suite - special thanks go to the guys who hauled a GAP antenna in and had it available at the suite - it worked a LOT better than my dipole made from two mobile antennas at 3 feet in the bushes outside the window....

Someone else will have to tell you about the flea market - I never got out there, and only got around inside for about an hour on Sunday - the rest of the time I was in my booth.

Sure was nice to meet a lot of the people from the list.

I have got to get some sleep - 73.....

73 - Bill Kelsey - N8ET
Kanga US
kanga@bright.net
419-423-4604
<http://qrp.cc.nd.edu/kanga/>

From owner-qrp-l@Lehigh.EDU Sun May 19 22:32:44 1996
From: Bruce Pea <pea@wolfram.com>
Subject: [8700] Good Times at Dayton!
Message-ID: <199605200157.UAA03093@dragonfly.wolfram.com>

Hi Gang -

Just a note to everyone I didn't get a chance to say goodbye to; it was great meeting all of you. This was my first trip to Dayton and I enjoyed it tremendously! Meeting and talking with all of you was most of the fun. I'm looking forward to next year!

72,

Bruce, N9WKE

From owner-qrp-1@Lehigh.EDU Sun May 19 22:32:44 1996
From: "Rafael Garcia (EA4RJ)" <tie@bitmailer.net>
Subject: [8688] Hamstick People
Message-ID: <Pine.LNX.3.91.960518164636.2120A-100000@ea4rj.ampr.org>

Hello

Does anybody know if Lakeview Antennas have an e-mail address? I'm worried about an inquiry I've made at early April without reply from them.

Regards,

Rafael,
Madrid (Spain)

From owner-qrp-1@Lehigh.EDU Sun May 19 22:32:44 1996
From: Jerry Parker <jparker@fix.net>
Subject: [8693] Lakeview email Address
Message-ID: <199605191753.KAA27817@fletch.fix.net>

The Lakeview Antenna Company does not have a email address
according to Butch.

72, Jerry...WA6OWR...K

From owner-qrp-1@Lehigh.EDU Sun May 19 22:32:44 1996
From: NYOUNG@nova.wright.edu
Subject: [8699] Loony Alert! Hamvention is Over! Young bought a modem!
Message-ID: <01I4WH2QFUAQ8X4SB6@nova.wright.edu>

Loony Alert! Hamvention is Over! Young bought a modem! His son installed it! Now Young is back causing trouble! Watch out for aliens!

I saw in one of the local tabloidoids (not to be confused with Altoids) that the Hubbel space telescope had taken a picture of

"heaven." Only one problem: Elvis wasn't there!

First time in many years I tuned around on 20m after the HV collapsed and tried to snag a couple QSOs with the Russian hand pump that Dick Pascoe badgered me (mercilessly, I might add) into buying. I couldn't catch anyone!

I knew that I should have taken that TCS transmitter/receiver set off the guy in the flea market when I first saw it. (I went back on Sunday morning and the guy had pulled up snakes and left.) Now I have a key from Mother Russia, but no rig that will chirp appropriately when I use it.

Sometimes the magic works. Kinda like when Sohail got out stumped in the match with India.

73

Nils

WB8IJN +c

And a big howdy-y'all to every one of the many people who I met and talked to and bored to tears at the QRP hospitality suite. This is a truly marvelous gang of lunatics. See ya on the air. Or I can send a picture of the "building and experimenting more than on the air" guy to Chuck for inclusion on the page page. (And I have stored the bulletin board for safe keeping until next year.... I think.... Do we get tapioca? Farm kitchen... blinds drawn...)

From owner-qrp-1@Lehigh.EDU Sun May 19 22:32:44 1996

From: BillCombs@aol.com

Subject: [8692] Low Power FM Broadcast

Message-ID: <960519125156_494131504@emout10.mail.aol.com>

I have a question that does not pertain to this list, but I have not been able to find any info anywhere so I thought I would see if anyone out there could help or direct me. I have called the FCC, but I can't seem to get past all the bureaucrats in order to talk to someone who knows anything.

I am trying to find info on low power, noncommercial FM broadcast stations. The school where I work is interested in setting one up. Back in the 60s when I took my 2nd class radio telephone license, I remember questions about 10 watt FM college stations that did not have to meet all the requirements of regular stations. Does anyone have any info on this. I am also interested in the requirements for noncommercial stations in general. I know they operate at the low end of the FM band, around 88 to 89 mhz. I have gotten the

impression from some of the things I have read (and it clearly may be a false impression) that people are operating 10 watt stations without a license. Is this now legal? I have looked at the books which deal with the radio telephone commerical license, but again I find nothing about the noncommerical part of the band or about low power college stations in particular. I notice Ramsey Electronics is selling some 1 watt and lower, stereo FM transmitters. They suggest, I believe, they are used by college stations.

Thanks,

Bill K4CPK

BillCombs@aol.com

From owner-qrp-1@Lehigh.EDU Sun May 19 22:32:44 1996
From: ab4el@nando.net (ab4el)
Subject: [8690] QRP HTTP's
Message-ID: <9605191625.AA13311@nando.net.nando.net>

Folks!

I'm beefing up my ham radio web pages at SunSITE:
<http://SunSITE.unc.edu/modena/hamradio.html>

I would be interested to receive URLs of strongly QRP oriented web sites/pages that you know of. Ditto for GOPHER and FTP archives.

One liners are OK..send to: AB4EL@nando.net

--

72&73/Steve/AB4EL

From owner-qrp-1@Lehigh.EDU Sun May 19 22:32:44 1996
From: launerb@crl.com (William H. Launer)
Subject: [8695] Receivers
Message-ID: <v01520d00adc514d2fd97@[192.0.2.1]>

Hi, Gang

While I haven't yet acquired/built a 40-9'r rig, I've read the various questions and discussions with interest. It seems that the majority of discussion has centered around improving the receiver section. Because the discussions raised my interest, I dug out my

old ARRL handbooks, and my copy of the "Radio Handbook", edited by Bill Orr, (19th Edition). The latter has an excellent section on "Communication Receiver Fundamentals" and I heartily recommend buying, borrowing, or stealing a copy to read; this 51 page section alone is worth the price of the book. The 19th edition was printed in 1972, but I have no doubt that later editions would be just as informative.

I must admit that I have a fetish with receivers, because "if you can't hear them, you can't work them"! While simplicity and small size are important for backpacking/portable operation, they aren't nearly as important for the average home station operator. In this environment, we are plagued with nearby bc stations, other ham stations, appliance emissions, line noise, etc. In my estimation, one of the weakest points in the typical "modern" ham receiver is the lack of front-end selectivity. This includes not only the simple direct-conversion receivers, but also the "multi-kilobuck" offerings from the manufacturers. Sensitivity is not a real issue; most designs are adequate in this department.

A receiver is a "system"; it's overall performance comes from all the parts. The best designs don't allow the noise to get into the receiver in the first place. The "ricebox" hf front ends are typically designed like their vhf and uhf fm rigs, and then they try to gain overall selectivity with filtering in the if and audio stages. The problem of poor basic design can't easily be solved with the addition of an integrated circuit and/or a microprocessor downstream in the system! Broadband rf bandpass transformers are great for transmitter outputs, but a real detriment to a receiver front end.

Recently, when WA3NNA in Pennsylvania put his 80 meter cw beacon on the air, I was able to copy his 200 milliwatt signal here in Missouri, with my SP-600, but the signal was too far down in the qrn to successfully copy with my FT-301. I attribute this mainly to the fact that the SP-600 has much sharper "front-end" selectivity due to it having two tuned rf amplifiers and a tuned mixer. I used the same antenna (an end-fed wire lying on the rooftop (soon to be changed)) and antenna tuner with both receivers, and used a 500 kc if selectivity setting with both receivers.

As qrp advocates (often accused by our qro brethren of playing with "toy radios"), we need to really concentrate on improving the "state of the art". The "Radio Handbook" defines a direct conversion receiver as "a variation of the "autodyne detector", which makes use of a separate oscillator" (The "autodyne detector" is also known as a regenerative detector). Let's not ignore 75 years of receiver design, and settle for 1920 receiver circuits. I firmly believe that one of the best arguments for qro is the modern "off the shelf" commercial rig, which can't hear weak signals. For starters, don't discount the old "boatanchor" receivers you see at hamfest fleamarkets. But be selective with what you get, there are "dogs" out there, too. Don't be afraid of tube type equipment, most tubes are still readily available. Everyone should have a good general coverage receiver, anyway, even if only to listen for "spurs" on your transmitter

outputs! It's an important piece of test equipment.
Now, the floor is open for discussion.

72, Bill - wb0cld

Bill Launer
St. Charles, MO
launerb@crl.com
wb0cld@wb0cld.ampr.org [44.46.66.25]
qrp-l #279 qrp arci #3551

From owner-qrp-l@Lehigh.EDU Sun May 19 22:32:44 1996
From: Gary Evans <gevans@lightspeed.net>
Subject: [8684] Shareware for circuit board design
Message-ID: <319EA4B6.3B6C@bak2.lightspeed.net>

Does anyone know of a good shareware program suitable for designing
circuit board layouts? Thanks...

From owner-qrp-l@Lehigh.EDU Sun May 19 22:32:44 1996
From: Dale Wentz KB9JJA <slip50@accessus.net>
Subject: [8689] Surface Mount
Message-ID: <01BB455A.ECB552E0@thekeep>

I have worked with surface mounted parts, and find that super glue works wonders
to hold the the little parts in place before soldering.

I also keep some super glue remover handy just in case.

Works great, and you can put down as many parts as you like before soldering.

73's de KB9JJA/Dale

From owner-qrp-l@Lehigh.EDU Sun May 19 22:32:44 1996

From: cookies@pop.jaring.my (Siong Teck Cheun @ Joseph)
Subject: [8686] Transistor 2SC 2097 or equivalent
Message-ID: <199605190615.0AA15911@jaring.my>

Hi anyone out there,

Can any one have any data on the equivalent for Transistor 2SC 2097 an Output transistor of an ICOM handie set.

Any suggestions??

72/73

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*****
*      SIONG 9M8ST/V85ST          /-/-/ ~ /|\          *
*      G-QRP 7986                /^\ |/\ |/_|_ \         *
*  e-mail cookies@pop.jaring.my    |    //^^\ \         *
*  snail mail address :          ____/^\_/_|_|%@|_ _ \       *
*  171D Cookes Drive                                     *
*  93150 Kuching Sarawak                                     *
*  MALAYSIA                                                  *
*                                                              *
*      # For more information about SARAWAK check in #      *
*                                                              *
*      http://www.sarawak.gov.my/stb                        *
*                                                              *
*****
```

From owner-qrp-1@Lehigh.EDU Sun May 19 22:32:44 1996
From: Roger Hightower <aa7qy@dancris.com>
Subject: [8691] Re: A Story Of My St.Louis Tuner
Message-ID: <199605191634.JAA03767@user.dancris.com>

At 11:43 PM 5/18/96 -0600, Jerry wrote:

> Spent a lot of time trying to get the sticky stuff off the cabinet cases
where the
> tap was. Painted the cabinet cases horizon blue. What a mess!! Did not get
> all the sticky stuff off, looks terrible. Will have to sand it off
tomorrow and start again.
>

Jerry,

There are two products that will take the "sticky stuff" off easily. First, the ever-useful WD-40, and once the sticky stuff is gone, wipe with alcohol to prepare for paint.

The other item is "Goof-Off", found in most hardware/paint stores. It even takes paint off, and is not toxic like paint removers.

72/73, de Roger, AA7QY

NorCal 1099 CoQRP 176 QRP-L 62 G-QRP 9081 ARCI 8946 NE-QRP 383

From owner-qrp-1@Lehigh.EDU Sun May 19 22:32:44 1996

From: Tom Bowman <tbowman@nbn.net>

Subject: [8694] Re: Low Power FM Broadcast

Message-ID: <2.2.16.19960519193140.1ccf45e2@nbn.net>

Bill: I attached a file I copied off packet almost two years ago, 6-11-94....While I can't vouch for its accuracy, it might point you in the right direction.... I don't believe the 10 watt "community" FM licenses are being granted anymore....I checked with the FCC on them about two years ago and they said they are no longer issuing licenses to 10 watt stations....Please let me know what you find out about licensing.

73, Tom

At 12:51 PM 5/19/96 -0400, BillCombs@aol.com wrote:

>I have a question that does not pertain to this list, but I have not been
>able to find any info anywhere so I thought I would see if anyone out there
>could help or direct me. I have called the FCC, but I can't seem to get past
>all the bureaucrats in order to talk to someone who knows anything.

>

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>The school where I work is interested in setting one up. Back in the 60s when
>I took my 2nd class radio telephone license, I remember questions about 10
>watt FM college stations that did not have to meet all the requirements of
>regular stations. Does anyone have any info on this. I am also interested in
>the requirements for noncommercial stations in general. I know they operate
>at the low end of the FM band, around 88 to 89 mhz. I have gotten the
>impression from some of the things I have read (and it clearly may be a false
>impression) that people are operating 10 watt stations without a license. Is
>this now legal? I have looked at the books which deal with the radio

>telephone commerical license, but again I find nothing about the
>noncommerical part of the band or about low power college stations in
>particular. I notice Ramsey Electronics is selling some 1 watt and lower,
>stereo FM transmitters. They suggest, I believe, they are used by college
>stations.
>
>Thanks,
>
>Bill K4CPK
>
>BillCombs@aol.com
>
>MSG # TR SIZE TO FROM @BBS DATE TITLE
27973 B# 4558 INFO N10HX ALLUSA 940611 3 meter fm,with no license, LEGALLY!
Forwarding path: WB3FYL N3DPU N3IQD WA20LZ KA2CHO W2ODV N2IMC N2NSA
WA2JVM WA2SNA WA2AWG WA2UMX WA1TPP WB1DSW WA1WOK

Hello and tnx for reading this.
To all homebrewers and electronics experimenters:

Looking for an alternative band to experiment with low power transmitters?
How about the regular old FM broadcast band? Anyone, with or without a
license can transmit low-power signals on the 88-108 mhz fm broadcast band.

You may be thinking of those old wireless MICs that were popular a while
back. Well, now you can do a little more. For example:
FCC part 15 allows a field strength of 250uv per meter.
In other words, a calibrated field strength meter will read 250uv(micro-
volts) with a 1 meter antenna held 3 meters from your transmitting antenna.
This is the absolute maximum power allowed! Why measure field-strength?
Well, say the fcc allowed 100 milliwatts of transmitter output. One
could then built a 10 db gain antenna and get an equivalent 1 watt output.
The fcc wont stand for this on the broadcast band. So if you should build
a 10 db gain antenna for your low-power transmitter, then you must decrease
your power output by 10 db.
So, what can you do with 250uv per meter? A lot more than you think!
For example, following the inverse square law of radio waves:

At 10 feet from your transmitting antenna, the voltage induced in a 1
meter long antenna will be 250uv.
At 20 feet, 125uv
at 39 feet, 63uv
at 78 feet, 31uv
at 157 feet, 15uv
at 1260 feet, 1.9uv
And at 5038 feet, almost a mile, the field strength will be .5uv
Now, for perfect stereo sound, the lower limit for most recievers is
1.7uv. But, sacrificing a little sound quality, most recievers will

"hear" all the way down to .5uv

I use a C2498 NPN transistor for the final amplifier in my project. Running 9 volts on the collector, with a 250 ohm resistor for the collector load, my field strength is just under the limit. Driving a dipole antenna, at 30 feet, the signal can be heard for a mile in any direction.

Remember, there are no antenna restrictions, as long as the field strength is under 250uv 3 feet from the antenna. So, what do you transmit? Well, about anything within the boundaries of good taste. Before you plop down on a frequency, you must make certain, by law, that it is clear. If anyone tells you that you are interfering with thier favorite radio station, you gotta change frequency or shut-er down. Ive used mine to keep track of whats going on on 2 meters while out washing the car. Packet is possible too. Ur transmitted bandwidth must not exceed 200 khz. Thats more than enough bandwidth! Remember that a lot of digital recievers are programmed to only stop every 200 kc. for example, 102.9 102.7 102.5 etc. if you start up on 102.8 not many digital recievers are going to hear you.

And finally, do not use any made up call-signs. Also, if you transmit for long periods of time, you might want to state your location and the fact that you are using a low-power part 15 device. This might keep ur ham buddy down the road from thinking you are a bootlegger.

And, dont be afraid that 20 FCC engineers are going to storm your house to make sure you are legal. At these power levels, a car moving down the road would completely pass through your whole coverage area within a minute. Any experienced engineer would recognize your feeble field strength as being proper. The maximum field strength will cover 1830 acres.

If you enjoyed this message, please let me know. Or, if you would like some transmitter ideas, also let me know. If I get enough replies, I got some info on the 560-1750 khz a.m. band that I would be more than happy to share.

Enjoy!

73, steven/N10HX @ KA1RTW.ME.USA.NA

*** END OF MSG # 27973 from N10HX @ WA1WOK.FN43FE.NH.USA.NOAM

Tom Bowman, WA3REY, Mount Gretna, PA 17064 tbowman@nbn.net

From owner-qrp-l@Lehigh.EDU Sun May 19 22:32:44 1996

From: Steven Wilson <randyw@crl.com>

Subject: [8696] RE:Receivers

Message-ID: <Pine.SUN.3.91.960519143910.25282A-100000@crl5.crl.com>

Bill has raised a very important point that should be considered by both the designers and qrp users. Receiver design specifications do not seem to exist for our portable qrp rigs. Everyone seems to take as the standard either a NE602/LM38X or NE602/MC1350/NE602/LM38X as being the standard. Serious consideration should also be given to 'gain distribution' and selectivity.

A good Collins had/has a gain of 100 db between the antenna and product detector. The system gain was 8 db between the antenna and 1st mixer. The typical qrp design has 0 between the antenna and 1st mixer(602). We tend to put all the selectivity and gain in the audio stages. Perhaps we should revisit the selective and gain of a RF stage before the 1st mixer. The RF stage was a source of some IM distortion. A good AGC design reduces the effect or brute force switch a 6 db RF attenuator in the receiver line.

You do not need a lot of gain in the RF stage. Most of the Drake receivers had 6 db.

all of the above gains(db) are voltage...

de stan ak0b
e-mail via randyw@crl.com

From owner-qrp-l@Lehigh.EDU Sun May 19 22:32:44 1996
From: "Dana H. Myers" <myers@bigboy.West.Sun.COM>
Subject: [8697] RE:Receivers
Message-ID: <Roam.3.0.832543337.15877.myers@bigboy>

> Bill has raised a very important point that should be considered by both
> the designers and qrp users. Receiver design specifications do not seem
> to exist for our portable qrp rigs. Everyone seems to take as the
> standard either a NE602/LM38X or NE602/MC1350/NE602/LM38X as being the
> standard. Serious consideration should also be given to 'gain
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>
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> detector. The system gain was 8 db between the antenna and 1st mixer.
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> tend to put all the selectivity and gain in the audio stages. Perhaps we
> should revisit the selective and gain of a RF stage before the 1st
> mixer. The RF stage was a source of some IM distortion. A good AGC
> design reduces the effect or brute force switch a 6 db RF attenuator in

> the receiver line.

What kind of performance does the 1st mixer in a Collins receiver offer? The NE602 has a pile of gain, but an IP3 of something like -15dBm. For the NE602 to work well, you need to have a fairly selective front end filter.

> You do not need a lot of gain in the RF stage. Most of the Drake
> receivers had 6 db.

My belief is that the gain before the "roofing" filter, i.e., the first narrow IF filter, should be just adequate to maintain little more than 0dB from the antenna to the output of the roofing filter.

Dana
Dana.Myers@West.Sun.Com
<http://www.source.net/~dana/>

From owner-qrp-1@Lehigh.EDU Sun May 19 22:32:44 1996
From: mjsilva@ix.netcom.com (michael silva)
Subject: [8698] Re: Receivers
Message-ID: <199605192242.PAA23397@dfw-ix6.ix.netcom.com>

> The "Radio Handbook" defines a direct conversion receiver
> as "a variation of the "autodyne detector", which makes use of a
> separate oscillator" (The "autodyne detector" is also known as a
> regenerative detector).

Coincidentally I've just read a few articles (from the '30s) on regenerative DC receivers (historical tidbit: the DC detector was also called a "homodyne detector" at the time). Apparently the combination of separate oscillator injection and detector regeneration (always kept slightly -below- the self-oscillation point) produced a large increase in performance over either the autodyne or straight DC detector, probably from stronger oscillator injection (the autodyne is most sensitive when it is oscillating at its weakest) and the input peaking effects of the regeneration. Then again, if one can pick up 40db of gain in the regenerative detector that's 40 less that needs to be made up further down the line. Sounds like something I'll have to play around with sometime soon. Of course some current designs might be using exactly this technique, but I haven't run across them -- *I* had to go back 65 years to learn about it!

73,
Mike, KK6GM